

GETTING THE MOST OUT OF JOB HAZARD ASSESSMENTS

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**“GENTLEMEN, WE WILL CHASE
PERFECTION, AND WE WILL CHASE IT
RELENTLESSLY, KNOWING ALL THE
WHILE WE CAN NEVER ATTAIN IT. BUT
ALONG THE WAY, WE SHALL CATCH
EXCELLENCE.”**

— VINCE LOMBARDI JR.

OUTLINE

- Background
 - Job Hazard Assessments
 - ANSI Z590.3 (2011) – *Prevention Through Design*
 - HAZOP
 - Excel-based JHA Tool
 - Conclusion
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JOB HAZARD ASSESSMENT

- 29 CFR 1910.132(d) & Subpart I Appendix B
 - Appendix B Steps:
 - Survey
 - Sources
 - Organize & analyze data
 - Mitigation
 - Reassessment
-

TYPICAL JHA [SUBPART I, APPENDIX B]

Source	Assessment of Hazard	Protection
IMPACT – Chipping, grinding, masonry work, woodworking, sawing, drilling....	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. For severe exposures use face shield.
HEAT – Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Face shield over goggles.
	Splash from molten metals	Screen/reflective face shields
	High temperature exposure	Screen/reflective face shields
DUST – Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types.

LIMITATIONS

- No discussion of root causes (e.g., culture, training, values, etc.) other than the immediate hazard.
- Avoids discussion of risk (severity + probability).
- Doesn't evaluate residual risk.
- Assessment is often limited to PPE controls.
- Avoids the discussion with management what level of risk is acceptable.

Source	Assessment of Hazard	Protection
IMPACT – Chipping, grinding, masonry work, woodworking, sawing, drilling....	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. For severe exposures use face shield.
HEAT – Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Face shield over goggles.
	Splash from molten metals	Screen/reflective face shields
	High temperature exposure	Screen/reflective face shields
DUST – Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types.

IS THERE A DIFFERENCE?



Job Safety
Analysis?

The diagram features a central yellow starburst shape with the text 'Include Risk Assessment!' inside it. To the left of the starburst is a large green arrow pointing left, containing the text 'Job Safety Analysis?'. To the right of the starburst is a large blue arrow pointing right, containing the text 'Job Hazard Analysis?'. The entire diagram is set against a dark gray background.

Include Risk
Assessment!

Job Hazard
Analysis?

RISK ASSESSMENT BENEFITS

- Effectively utilizes limited resources.
 - Allows for prioritization of risks.
 - Allows non-experts to quickly review exposure risks of new operations.
 - Provides a transparent method of evaluation and control recommendation.
 - Globally, allows risk determinations where otherwise wouldn't exist.
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STEPHANIE KLEIN-DAVIS | The Roanoke Times

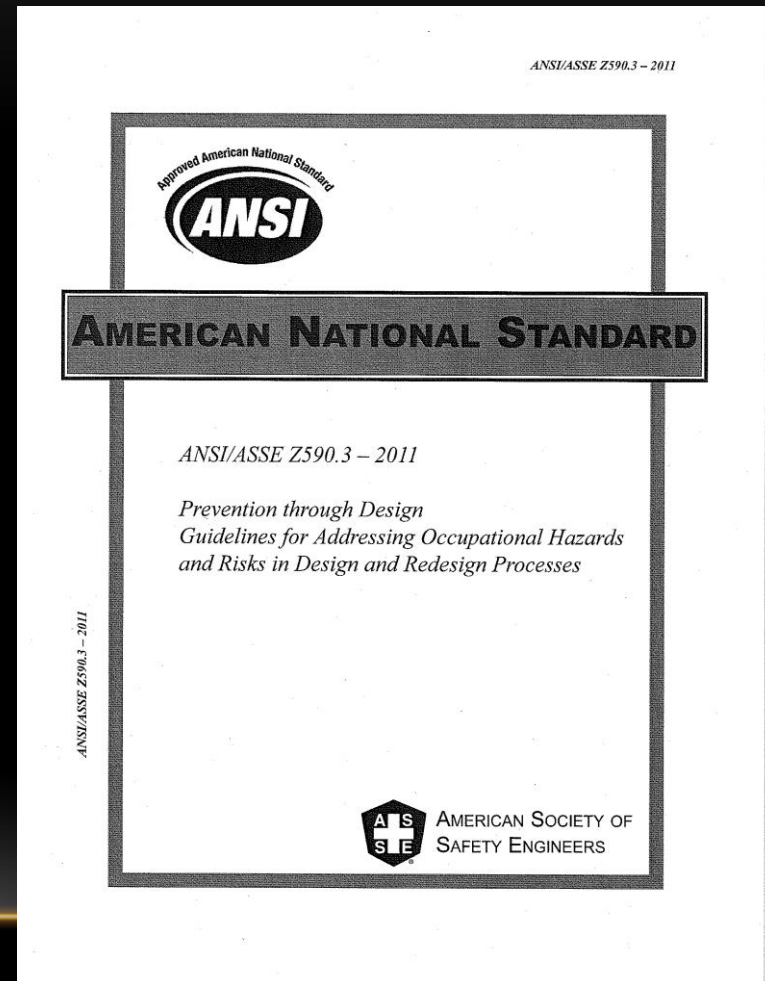
Used with permission - Stephanie Klein-Davis

TYPES OF RISK ASSESSMENTS

- Failure Mode & Effects Analysis (FMEA)
- Probabilistic Risk Assessment
- Fault Tree Analysis
- ANSI/ASSE Z590.3 (2011) PtD
- Bayesian Theory
- REACH Exposure Scenarios
- Control Banding
- Hazard & Operability Study (HAZOP)

ANSI/ASSE Z590.3 (2011) PREVENTION THROUGH DESIGN

- Voluntary consensus standard.
- Strives to eliminate, reduce or control hazards throughout a product or process life cycle.
- Greatest benefit is early in the life cycle.
- Complements the ANSI/AIHA Z10 *Occupational Health & Safety Management Systems* standard.



ANSI/ASSE Z590.3 PROCESS

1. Seek management approval of process/matrix.
 2. Establish scope, timing, limits of the analysis.
 3. Identify hazards, severity of consequences, and probability.
 4. Define the initial risk (uses 2x2 matrix)
 5. Select and implement risk reduction method(s).
 6. Assess residual risk
 7. Document and follow-up.
-

IDENTIFY HAZARDS

- Susceptible to expertise and judgment.
- Standardize process by:
 - Hazard checklists.
 - Interviewing/involving engineers or operators.
 - Considering non-typical operating conditions.
 - Evaluating chemical, biological, physical hazards.
 - Considering failure modes:
 - What can go wrong, causes, effects, frequency, severity, etc.

ASSESS SEVERITY

- Base on worst *credible* (vs. conceivable) consequence.
- Use objective historical data (if available) to tailor category descriptions to the business.
- Consider effects on:
 - Injury number/severity
 - Environmental damage
 - Productivity losses
 - Health effects
 - Others

SEVERITY CATEGORIES & VALUES

- **Catastrophic:** fatalities, permanent total disability, system loss, lasting damage, exposures usually $> \text{OEL}$.
- **Critical:** permanent partial / temporary disability, major property damage/loss, exposures sometimes $> \text{OEL}$.
- **Marginal:** Medical/restricted work, triggers environmental reporting, exposures usually 50 – 99% OEL.
- **Negligible:** First aid, routine chemical cleanup, exposures usually $< 10\% \text{ OEL}$.
- **Insignificant:** Inconsequential effects; exposures $< 1\% \text{ OEL}$.

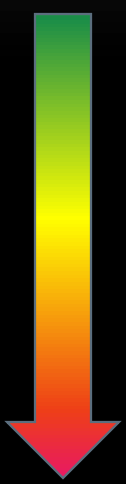
ASSESS PROBABILITY

- Consider frequency, duration, number exposed, etc.
- Relate to an interval such as time, units produced, etc.
- Categories
 - **Frequent:** Likely to occur repeatedly
 - **Probable:** Occurs several times
 - **Occasional:** Occurs intermittently
 - **Remote:** Could occur, but rare.
 - **Improbable:** Will not occur.

DEFINE RISK

	Catastrophic	Critical	Marginal	Negligible
Frequent	High	High	Serious	Medium
Probable	High	High	Serious	Medium
Occasional	Serious	Serious	Medium	Low
Remote	Medium	Medium	Medium	Low
Improbable	Low	Low	Low	Low

RISK MITIGATION

 <p>Best</p> <p>Worst</p>	Hierarchy of Controls
	Avoidance: Prevent risk during design
	Eliminate: Eliminate risk after discovery
	Substitute: Replace with less risky materials or processes
	Engineering Controls: Incorporate engineering controls
	Warning: Provide warning systems
	Administrative Controls: Develop training, scheduling, oversight, etc.
	Personal Protective Equipment: Administer PPE program [29 CFR 1910.132 et al]

HAZARD & OPERABILITY STUDY (HAZOP)

- Planned/existing process broken into 'nodes'.
- Piping & instrumentation diagram (P&ID) and process flow diagrams used.
- Multidisciplinary team reviews risks qualitatively.
- Guidewords used to prompt review of risks.

	More	Less	None	Reverse
Flow	High flow	Low flow	No flow	Reverse flow
Pressure	High pressure	Low pressure	No pressure	
Temp	High temp	Low temp		

- Deviations of design intent are then determined.

HAZOP COLUMN HEADINGS

Before Risk Reductions:

- Node
- Deviation (via guide words)
- Cause
- Consequence
- Risk (Severity+ Likelihood)
- Effective Safeguards

After Risk Reductions:

- Safeguards
- Recommendations
- Responsibility
- Status
- Risk (Severity+Likelihood)

[illegible][illegible]

SIMILARITIES

JHA	Z590.3	HAZOP
Define /prioritize job task steps	Define process / equipment	Define Nodes
Observations / SOPs	Equipment specs / P&ID's	Process Flow / P&ID's
Multidisciplinary team	Multidisciplinary team	Multidisciplinary team
List of Hazards & Results	Checklists & Failure Modes	Use Guide Words
Severity + Probability + Exposure	Severity + Probability	Severity + Probability
Danger Value + Danger Index	High/Serious/Medium/Low	Risk Rating
Determine corrective action	Determine corrective action	Determine corrective action

JHA FORMAT

Job or Position Description:

Equipment Name:
(Asset # if available)

Date Completed:




Bldg/Department:




Evaluator(s) Name:



HSE Review Signature & Date

JHA ID#
(HSE Completes)

Required PPE:







Engineering Control Recommendations:

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee	Biohazard Exposure	Infection	4	2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Exposure	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Exposure	Infection	4					Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Exposure	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Exposure	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

List Steps

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard ▼	No Hazard ▼	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard ▼	No Hazard ▼	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard ▼	No Hazard ▼	1	1	2	3	1							
Don PPE from BBP kit	No Hazard ▼	No Hazard ▼	1	2	2	6	1							
Treat and/or remove employee	Biohazard Exposure ▼	Infection ▼		2	3	38	2							
Apply available absorbents to bodily fluids	Biohazard Exposure ▼	Infection ▼	4	3	3	56	3							
Collect absorbent into biohazard waste bags	Biohazard Exposure ▼	Infection ▼	4	3	4	75	4							
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Exposure ▼	Infection ▼	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Exposure ▼	Infection ▼	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Exposure ▼	Dermatitis ▼	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock,	1	2	2	6.25	1	
	▼	▼				0	1					0	1	
	▼	▼				0	1					0	1	

Select Hazard & Result from drop-downs

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2						2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2						2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2					2	2	6.25	1	
Treat and/or remove employee	Biohazard Exposure	Infection	4	2	3					2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Exposure	Infection	4	3	3					3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Exposure	Infection	4	3	4					3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Exposure	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Exposure	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock,	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Assign Hazard Severity

DEFINE SEVERITY OF HAZARD



- **Negligible (1):** Minor first aid w/ no SIF potential; minor irritation; OEL >500ppm or 5 mg/m³; FP > 200F; little property damage (\$500 - \$1,999).
- **Minor (2):** Reversible injury/illness (lacerations, contusions, tendonitis, strong irritants, etc.); low SIF potential; OEL >250ppm or >2.5 mg/m³; FP 140F - 200F; Property damage \$2k - \$20K.
- **Moderate (3):** Severe reversible (fractures, strains, sprains, carpal tunnel, sensitization, corrosives) usually w/ lost days; some SIF potential; OEL >10ppm or 0.1 mg/m³; FP 100F - 140F; Property damage (\$20k - \$200K).
- **Major (4):** Catastrophic (death, amputations, hearing loss, 3rd degree burns, carcinogens, blindness); High SIF potential; OEL <10ppm or >0.1 mg/m³; FP <100F; Property damage > \$200K.

BASED JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3					2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3					2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard		2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee	Biohazard Expos	Infection		2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Expos	Infection		3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Expos	Infection		3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Expos	Infection		3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Expos	Infection		2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Expos	Dermatitis		2	2	25	2	Wear protective eyewear, faceshield, gloves, smock,	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Assign Risk

DEFINE PROBABILITY




- **Unlikely (1)**: Low frequency of occurrence (several times per month or year) or will not occur. Reliable and effective engineering controls in place.
- **Occasional (2)**: Medium frequency of occurrence (several times per week). Usually reliable and effective administrative controls or barriers in use.
- **Likely (3)**: High frequency of occurrence (several times per day). Behavior-based controls in place which are often variable.
- **Frequently (4)**: In constant occurrence throughout the day or during operation of equipment. Use of PPE, signs, training in place. Poor employee commitment.

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1					125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1					125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1					25	1	
Treat and/or remove employee	Biohazard Exposure	Infection	4	2	3	38	2					375	1	
Apply available absorbents to bodily fluids	Biohazard Exposure	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Exposure	Infection	4		4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
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	Chemical Exposure	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock,	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Assign Exposure

DEFINE EXPOSURE LEVEL

Best

Worst

- **Negligible (1)**: No people exposed.
- **Minor (2)**: 1 – 4 people exposed, but not necessarily concurrently.
- **Moderate (3)**: 5 – 9 people exposed, but not necessarily concurrently.
- **Major (4)**: ≥ 10 people exposed, but not necessarily concurrently.

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1							
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1							
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.						
Treat and/or remove employee	Biohazard Exposure	Infection	4	2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.						
Apply available absorbents to bodily fluids	Biohazard Exposure	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.						
Collect absorbent into biohazard waste bags	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.						
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.						
Apply disinfection product, allowing for adequate contact time.	Biohazard Exposure	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Exposure	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Danger Value & Index Auto-calculated

RISK ASSESSMENT MATRIX

Safety Risk Matrix

Hazard	Exposure				Risk
	1	2	3	4	
1	1.5	3.1	4.69	6.25	1
2	3.1	6.25	9.38	12.5	1
1	3.1	6.25	9.38	12.5	2
3	4.69	9.38	14.1	18.75	1
1	4.69	9.38	14.1	18.75	3
4	6.25	12.5	18.75	25	1
2	6.25	12.5	18.75	25	2
1	6.25	12.5	18.75	25	4
3	9.38	18.75	28.13	37.5	2
2	9.38	18.75	28.13	37.5	3
4	12.5	25	37.5	50	2
2	12.5	25	37.5	50	4
3	14.1	28.13	42.19	56.25	3
4	18.75	37.5	56.25	75	3
3	18.75	37.5	56.25	75	4
4	25	50	75	100	4

Area surrounded by the heavy box may under-characterize actual risk.

KEY:

	= Danger Index 1
	= Danger Index 2
	= Danger Index 3
	= Danger Index 4

DANGER INDEX VALUES

- **Level 1: Low Risk/Controls**
 - continue to maintain/manage risk.
- **Level 2: Moderate Risk/Controls**
 - use/budget engineering controls.
- **Level 3: High Risk/Controls**
 - use/budget containment and/or redesign.
- **Level 4: Severe Risk/Controls**
 - stop operations and consult an IH.

GUIDANCE SHEET

- Separate sheet for each Danger Index.

This control summary sheet is intended to provide general control strategies for the Danger Index calculated by the Risk Assessment Tool. For additional details, consult product MSDS, site operating procedures, Job Hazard Analysis (JHA), or contact your site EHS

Health Danger Index 1: Low risk but could be nearing levels of concern. Use good personal hygiene and PPE if desired. Conduct monitoring if desired.

Safety Danger Index 1: Relatively low importance / low action priority. Continue to maintain and re-address if process changes.

SUMMARY: Chemicals and processes falling in this Danger Index present minimal hazards to those exposed. Job tasks in this category still present opportunity for injury so employees must follow established procedures and training. Job tasks in this category should be routine, with minimal deviations, unique procedures, or specialized equipment necessary to complete the task. Representative air/noise monitoring is recommended to confirm employee exposures are acceptable.

DO's

- ✓ Be sure you understand the health and safety **hazards** of the chemicals you are using.
- ✓ Follow established **procedures and training** when conducting a job task. If you aren't sure about how to do a job, consult your supervisor.
- ✓ Always **wash your hands** after using chemicals, especially before eating and using the restroom.
- ✓ Make sure there is always good general room **ventilation** when using any hazardous materials.
- ✓ Know what personal protective equipment (**PPE**) you need for the job before you begin work. This information can be found in site Job Hazard Analysis (JHA's) or by contacting a supervisor.
- ✓ Remember, not all chemical gloves protect against exposure to all types of chemicals! Make sure you are using **appropriate gloves** by consulting the JHA or your supervisor.
- ✓ If you are concerned about your exposures to hazardous materials used at work, be sure to contact your EHS Administrator. [redacted] has an extensive **air monitoring** program to ensure that chemical exposures are at safe levels.
- ✓ Never attempt to clean up any **chemical spill** unless it is a very small incidental spill. Special training and equipment is required to clean up larger spills. Report all spills to your supervisor since some spills may be required to be reported to government agencies.
- ✓ Make sure you know the location of all **emergency equipment** before starting a task. This includes safety showers/eyewash, fire extinguishers, first aid kits, and telephones.
- ✓ Immediately **report signs** of leaks, wear or damage to equipment or chemical containers to your supervisor or EHS administrator.

DON'Ts

- ✗ Never **mix chemicals** together unless following a specific written procedure. Many chemicals when mixed together can form poisonous or flammable gases and vapors.
- ✗ Never use any chemicals or operate equipment that emits chemicals in a **confined space** without going through permit entry procedures and the use of air monitoring equipment.
- ✗ Avoid **eating or drinking** in areas where hazardous materials are used.
- ✗ Disposable personal protective equipment (PPE) is just that.... disposable. Avoid **repeated use** of single-use gloves, earplugs, dust masks and other disposable PPE since it loses effectiveness.
- ✗ Never **dump chemicals** down the drain or throw potentially hazardous debris in the trash. If you are not sure how to dispose of a potentially hazardous material, contact your supervisor or EHS Administrator.
- ✗ Don't allow **new chemicals and equipment** to be introduced into the workplace without going through an Environmental, Health & Safety (EHS) review. If it appears the materials, procedures or equipment you are working with has not been reviewed and approved by an EHS administrator, raise the issue with your site management or EHS Administrator.

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for assistance				1	2	3	1		1	1	2	3.125	1	
Barricade				1	2	3	1		1	1	2	3.125	1	
Obtain kits				1	2	3	1		1	1	2	3.125	1	
Don PPE				2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and employ				2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply absorbent fluids				3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Exposure	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Exposure	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Exposure	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock.	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Describe
Action to
Reduce Risk

REDUCING RESIDUAL RISK

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee	Biohazard Expos	Infection	4	2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Expos	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Expos	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and														

- ¹ = Reduction priority based on ALARP (As Low As Reasonably Practical)
- Eliminate hazard through redesign (for DI = 3 or 4)
- Substitution using less hazardous methods or materials (for DI = 2 or 3)
- Incorporation of safety devices or guards (for DI = 2 or 3)
- Providing warning systems (for DI = 1 or 2)
- Application of administrative controls (work methods, training, etc.) (for DI = 1 or 2)
- Providing personal protective equipment (for DI = 1 or 2)

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help							1		1	1	2	125	1	
Barricade affected area							1		1	1	2	125	1	
Obtain BBP & First Aid kits							1		1	1	2	125	1	
Don PPE from BBP kit							1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee							2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids							3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags							4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbent as necessary to clean up bulk fluid.			4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	8.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Expos	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Expos	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Assign revised Hazard, Risk, Exposure Rankings

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee	Biohazard Expos	Infection	4	2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Expos	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Expos	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Expos	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Expos	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Expos	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Note Reduced Danger Value & Danger Index

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1					Wear protective eyewear		2	2	6.25	1	
Treat and/or remove employee	Biohazard Expos	Infection	4							2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Expos	Infection	4							3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Expos	Infection	4	3	4	75	4	booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents as necessary to clean up bulk fluid.	Biohazard Expos	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Apply disinfection product, allowing for adequate contact time.	Biohazard Expos	Infection	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
	Chemical Expos	Dermatitis	4	2	2	25	2	Wear protective eyewear, faceshield, gloves, smock,	1	2	2	6.25	1	
						0	1					0	1	
						0	1					0	1	

Action Notes & Comments

JHA FORMAT

Task	Hazard Category	Result	Hazard Severity	Risk Probability	Exposure Level	Danger Value (Max. 100)	Danger Index (1,2,3,4)	Action to Reduce Risk ¹	Residual Hazard Severity	Residual Risk Probability	Residual Exposure Level	Residual Danger Value (Max. 100)	Residual Danger Index (1,2,3,4)	Further action Notes
Call for help	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Barricade affected area	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Obtain BBP & First Aid kits	No Hazard	No Hazard	1	1	2	3	1		1	1	2	3.125	1	
Don PPE from BBP kit	No Hazard	No Hazard	1	2	2	6	1	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	2	6.25	1	
Treat and/or remove employee	Biohazard Expos	Infection	4	2	3	38	2	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	2	3	9.375	1	
Apply available absorbents to bodily fluids	Biohazard Expos	Infection	4	3	3	56	3	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	3	14.0625	1	
Collect absorbent into biohazard waste bags	Biohazard Expos	Infection	4	3	4	75	4	Wear protective eyewear, faceshield, gloves, smock, booties to prevent exposure.	1	3	4	18.75	1	
Repeat application and collection of absorbents	Biohazard Expos	Infection						Wear protective eyewear,						

Values Are Averaged Below

						0.00	1					0	1	
						0.00	1					0	1	
						0.00	1					0	1	
AVG:			1.60	3.00	2.00	38.00	2		AVG:	1.00	3.00	2.00	9.38	1

DEVELOP SITE MASTER FILE

		▼		▼			0.00	1					0	1			
		▼		▼			0.00	1					0	1			
		▼		▼			0.00	1					0	1			
AVG:					1.60	3.00	2.00	38.00	2	AVG:			1.00	3.00	2.00	9.38	1

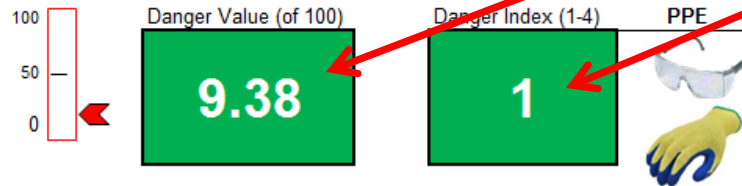
[illegible]

EQUIPMENT POSTING

							0.00	1						0	1		
							0.00	1						0	1		
							0.00	1						0	1		
AVG:				1.60	3.00	2.00	38.00	2	AVG:				1.00	3.00	2.00	9.38	1

Operating Cardboard Bailer

Date: 10/14/2016



This safety rating depends on following procedures and using safety devices

SET UP

1. Use caution while loading; load could slide off
2. Follow Lockout if inserting body into working areas of machine
3. Make sure you have the required PPE.

OPERATING

1. Do not overload the equipment.
2. Wearing gloves with stock will reduce the amount of hand lacerations
3. Trip & bump hazard when walking around rollerbeds; recommend shin guards
4. Avoid Strains - lift one box at a time; use proper turn movement

MAINTENANCE

1. Follow Lockout while guards are removed or body is in working area of machine
2. Follow proper waste disposal of hydraulic fluid; protect skin

Health or Chemical Risk: **4.17** out of 100.

REASSESSMENT

- Updated every 3 years, if deficient, or if process changes.
- Supervisors are accountable, employees responsible
- Users are encouraged to discuss results with EHS.
- JHA initiation and reassessment is conducted as part of change management process.
- For identified health exposures, subsequent exposure monitoring is conducted.
- Continuing to gain experience and adjust as needed.

LESSONS LEARNED



- ‘Goldilocks Syndrome’ when listing job tasks: just right!
- Uncertainty is inherent - - - define terms objectively.
- Plan in advance what is covered and order of execution.

Building:		Department:	
Job/Task or Equipment Name	Room # (if applicable)	SOP # (if applicable)	Completed Date

LESSONS LEARNED – CONT.

- Discuss with customers in advance how they'll use the information and where to keep.
- Train and involve the operators – they're the experts.
- Make sure to include unusual, non-routine steps!
- Build an EHS review 'chokepoint' into the process to avoid substandard products.
- Very useful during incident investigations.
- Discuss in advance how to keep them fresh.

BAYER'S EXPERIENCE

- Learning curve – calibration and hazard vs root cause.
 - Customer experience to date has been positive.
 - Allows non-experts to quickly review exposure risks of new operations.
 - Provides a transparent method of control recommendation.
 - Facility-wide evaluation allows prioritization of risks.
-

CAUTIONS

- User training is essential.
- Balancing uncertainty with effectiveness. Only suitable for entry level risk assessment.
- How risk assessment parameters are defined is critical.
- Not appropriate for “special” circumstances (e.g., spills, open spraying, pregnancy, synergism, etc).
- Must be an element of holistic management process.

SUMMARY

- Compliance may not achieve value / performance.
 - JHA's using risk assessment matrices can be an effective way to prioritize and mitigate risk.
 - Bayer's efforts successfully prioritize risk levels and meets business challenges.
 - Additional refinement is ongoing.
-

THANK YOU

Contact Information:

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